Latest Results from the New Mexico Project

Sep.11-12,2013

Kenichi Suzuki
Smart Community Department
NEDO, Japan

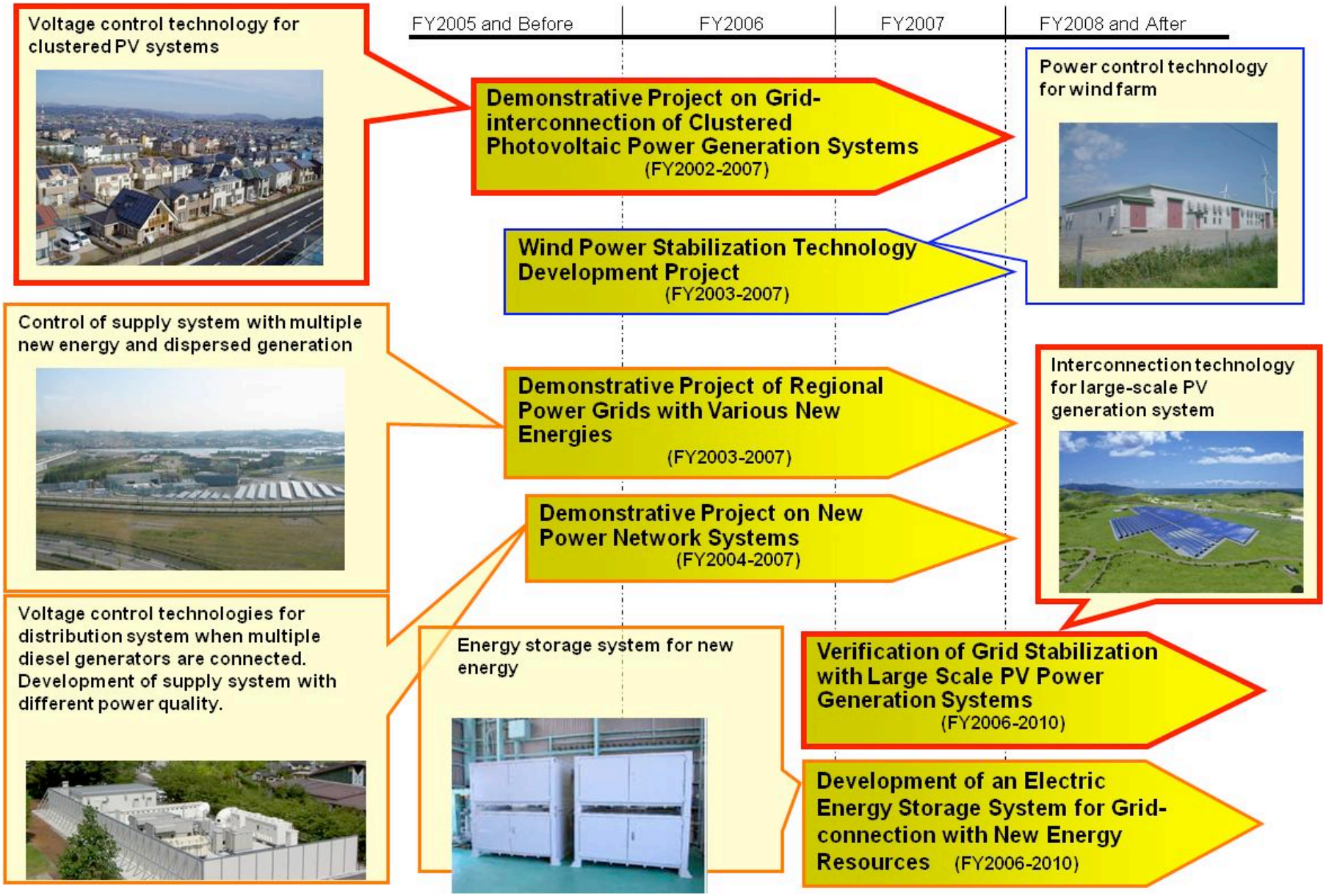
NEDO's Mission

Coordination with
Policymaking Authorities

Combined Efforts of
Industry, Government and Academia

- Addressing energy and global environmental issues through technology development and international collaborative demonstration projects
- Enhancement of cutting-edge industrial technologies

NEDO's Projects in Japan



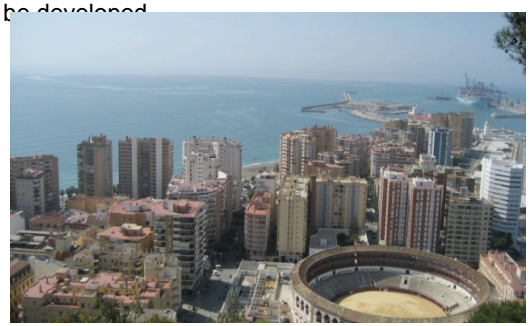
NEDO's Global Smart Community Projects

Lyon, France

Collaboration project between NEDO and Grand Lyon, which includes Lyon and its surrounding area. A new type of urban lifestyle will be demonstrated through smart redevelopment of an existing city by combining energy saving and an EV transportation system.

Malaga, Spain

Collaboration project among NEDO, Malaga City and the Centre for Industrial Technological Development (CDTI). The project will examine EV operating systems in a society where EVs have been disseminated. New business models that can achieve a low-carbon society by changing behavior in a community will then be developed.

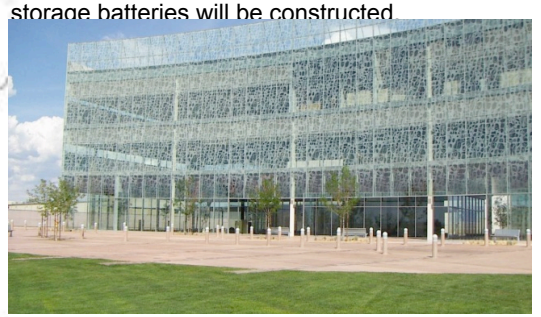


Gongquingcheng City, Jiangxi Province, China

Collaboration project among NEDO, Gongquingcheng City, the State Grid Corporation of China and other participants. The project aims at establishing a leading model for a smart community that can achieve both economic growth and a low-carbon society by utilizing renewable energy and low-carbon traffic management systems in small and medium cities, where the economy is expected to grow significantly.

New Mexico, USA

Collaborative project among NEDO, the State of New Mexico, national laboratories and other participants.
In an area where large-scale PV has been introduced, smart grid systems that combine demand response using real-time pricing and storage batteries will be constructed.



Maui Island, State of Hawaii, USA

Collaborative project among NEDO, the State of Hawaii, Hawaiian Electric Company and national laboratories. The project will introduce large-scale renewable energy, including wind and solar power generation, and construct a low-carbon model city for remote islands using an EV charging control system.

Ⅰ. NEDO Project in New Mexico

NEDO'S Project in New Mexico

- Location

NEDO'S Project in New Mexico

March 2010 MOU signing ceremony

Concluded an MOU with 7 affiliate US organizations and companies (*) and launched the demonstration project

*State of New Mexico, Sandia National Laboratories, Los Alamos National Laboratory, PNM, Los Alamos County, Mesa del Sol, and The University of New Mexico

November 2012 Japan-US joint workshop

A Japan-US joint workshop was held with the aim of reflecting the demonstration project and discussing the future course of action.

	FY2009	FY2010	FY2011	FY2012	FY2013
Overall Plan	△ MOU concluded			Japan-US joint workshop	Japan-US joint workshop
Albuquerque	Preliminary research	Design, construction	Equipment installed	Demonstration project	
Los Alamos		Design, construction	Equipment installed	Demonstration project	
Smart house (Los Alamos)		Development, evaluation, equipment manufacture, supply	Construction, installation work	Demonstration project	

November 2011
The ground-breaking ceremony in Los Alamos site

May 2012
Albuquerque ribbon cutting ceremony

September 2012
Los Alamos opening ceremony in Los Alamos site

NEDO'S Project in New Mexico

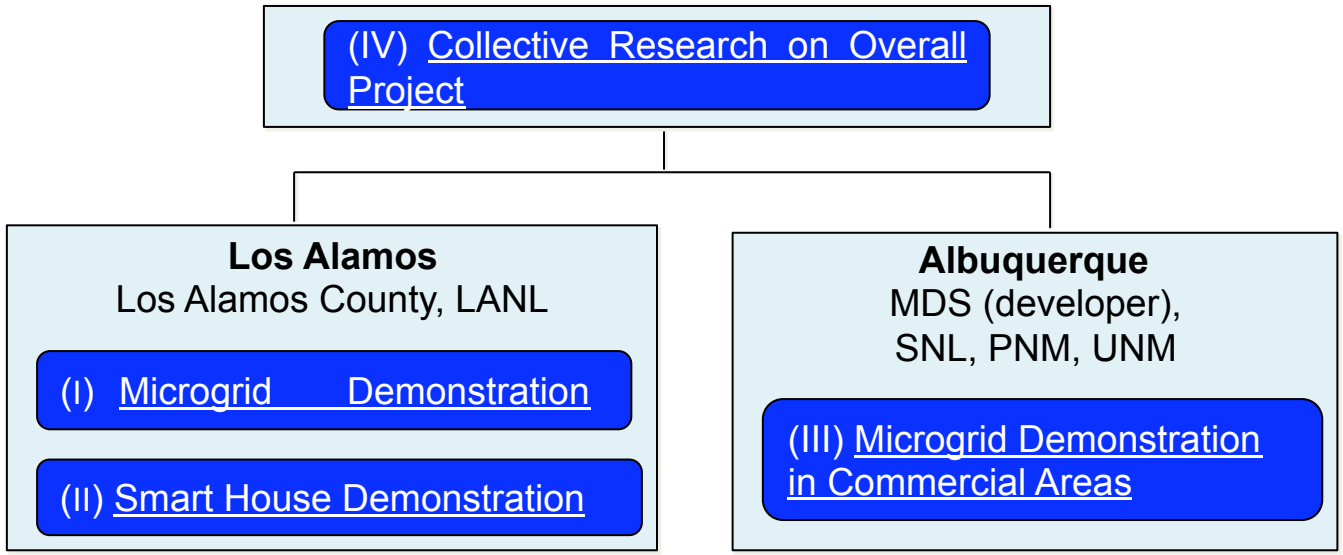
- New Mexico project is first overseas smart Grid Project of NEDO.
- The project is being carried out in cooperation with U.S. national laboratories, which conducts research on advanced technologies for renewable energy and energy security.

Japan Side (NEDO , Entrusted Company)

Toshiba Corporation
Hitachi, Ltd.
Kyocera Corporation
NGK Insulators, Ltd.
Itochu Techno-Solutions Corporation
NEC Corporation
Kyocera Corporation
Sharp Corporation
Shimizu Corporation
Meidensha Corporation
Fuji Electric Co., Ltd.
Tokyo Gas Co., Ltd.
Mitsubishi Heavy Industries, Ltd.
Furukawa Electric Co., Ltd.
Furukawa Battery Co., Ltd.
Cyber Defense Institute, Inc.
Accenture
Kandenko
Itochu Corpration

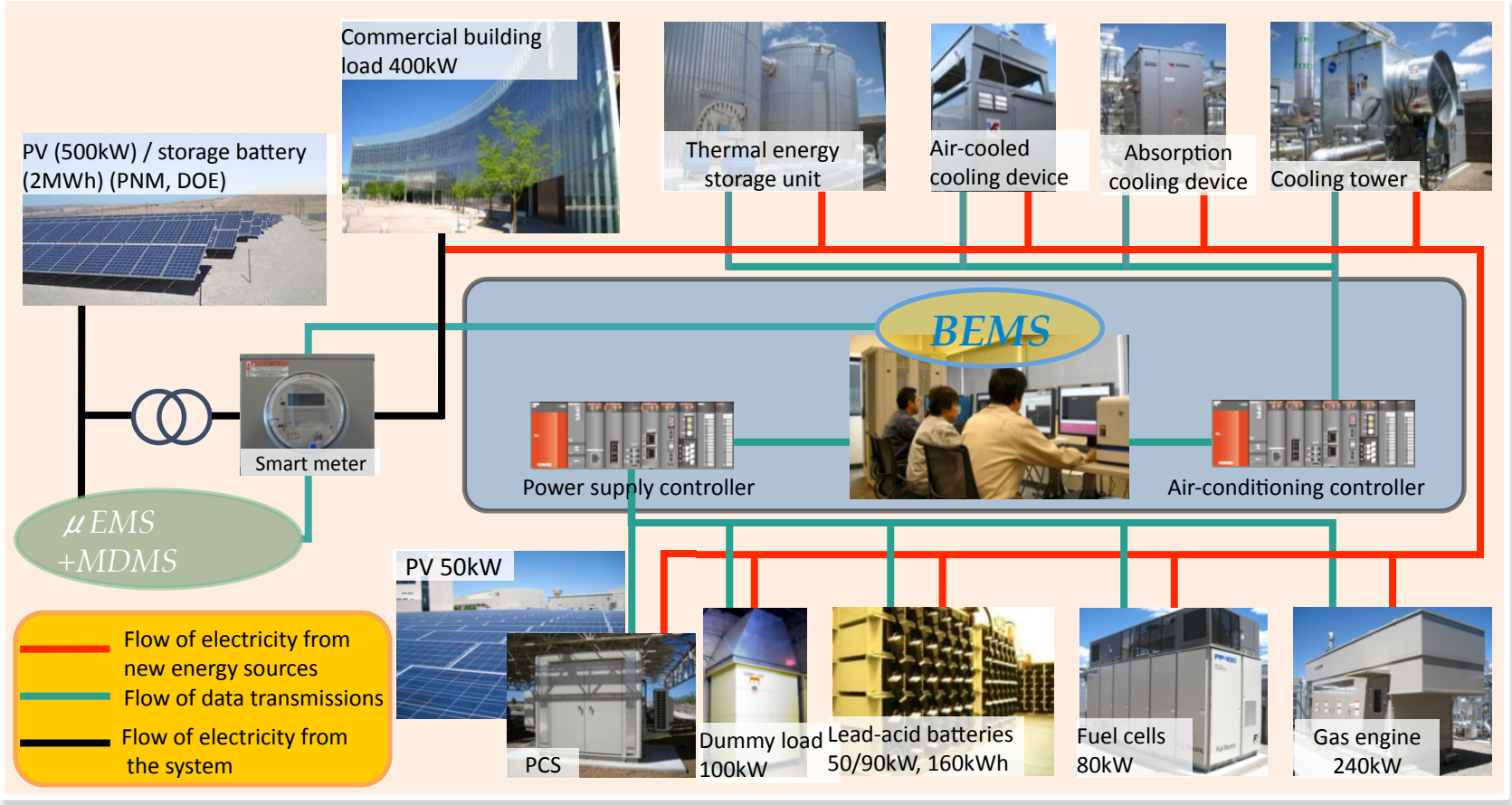
US Side

State of New Mexico
Los Alamos National Laboratory (LANL)
Sandia National Laboratories(SNL)
Los Alamos County (LAC)
The University of New Mexico (UNM)
Public Service of New Mexico (PNM)
Mesa del sol (MDS)



Smart Grid Demonstration in Commercial Areas in Albuquerque

Demonstration of a smart building that can respond to demand from a power grid (independent operation), which is receiving increased attention after Japan's Tohoku earthquake, will be carried out in Albuquerque.



- ✓ This project is designed to demonstrate a highly reliable building power system that can continue operating by using power storage cells, gas engine cogeneration, fuel cells, a heat storage tank, solar cells, etc. when grid connection to buildings is cut.
- ✓ It will be demonstrated that output fluctuations of solar cells in a distribution system will be absorbed by using EMS in buildings and grid and controlling building facilities.

Smart Grid Demonstration in Commercial Areas in Albuquerque

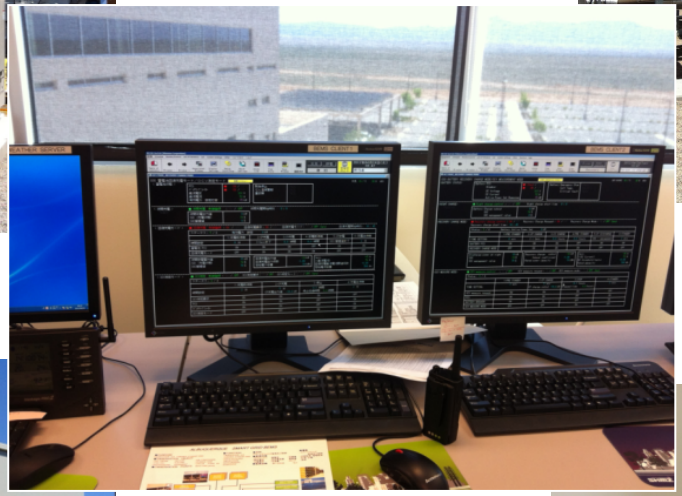
PV site

Distributed generators site

PV on the roof of parking lot

Smart Grid Demonstration in Commercial Areas in Albuquerque

Fuel cell



BEMS

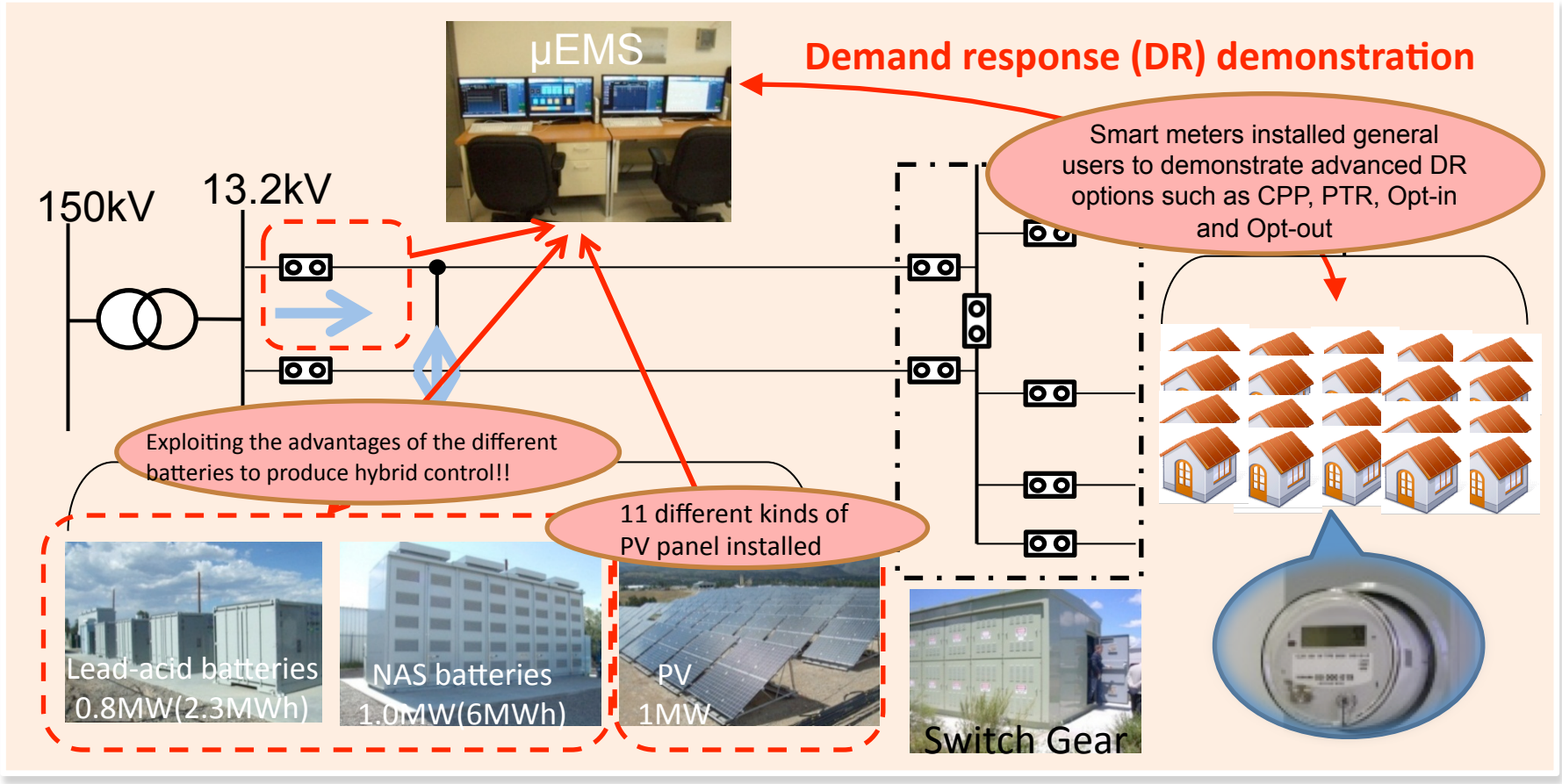
Heat storage

Gas engine

Battery room

Smart Grid Demonstration in Residential Areas Los Alamos

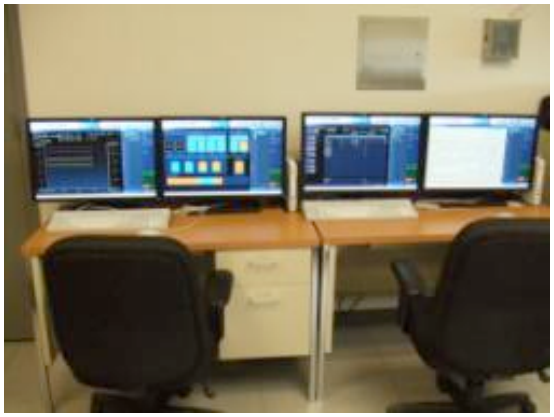
In addition to storage batteries for grids, control of renewable energy output fluctuations by using demand response of residential houses will be verified in a suburb-type distribution system located in a residential area. Moreover, Demand response demonstration is trying to operate.



✓ Concentration PV generation and power storage cells have been installed on distribution lines of about 3 MW. It will be demonstrated that PV output fluctuations will be absorbed by changing grid formation (PV introduction ratio) and using demand response and storage batteries for grids.

Smart Grid Demonstration in Residential Areas Los Alamos

PV site



µEMS

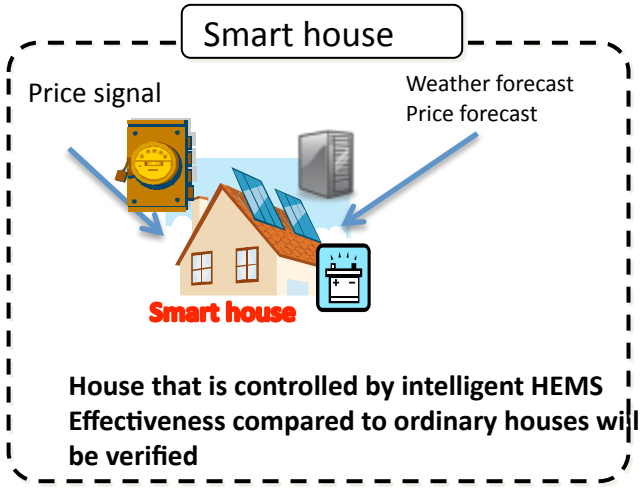
NAS Batteries

Lead-acid Batteries

Smart house Demonstration in Los Alamos

An intelligent home energy management system (HEMS) that is equipped with smart devices, including smart meters and smart electrical appliances, and optimizes the use of real time pricing has been installed in a house, and the effectiveness of HEMS will be demonstrated.

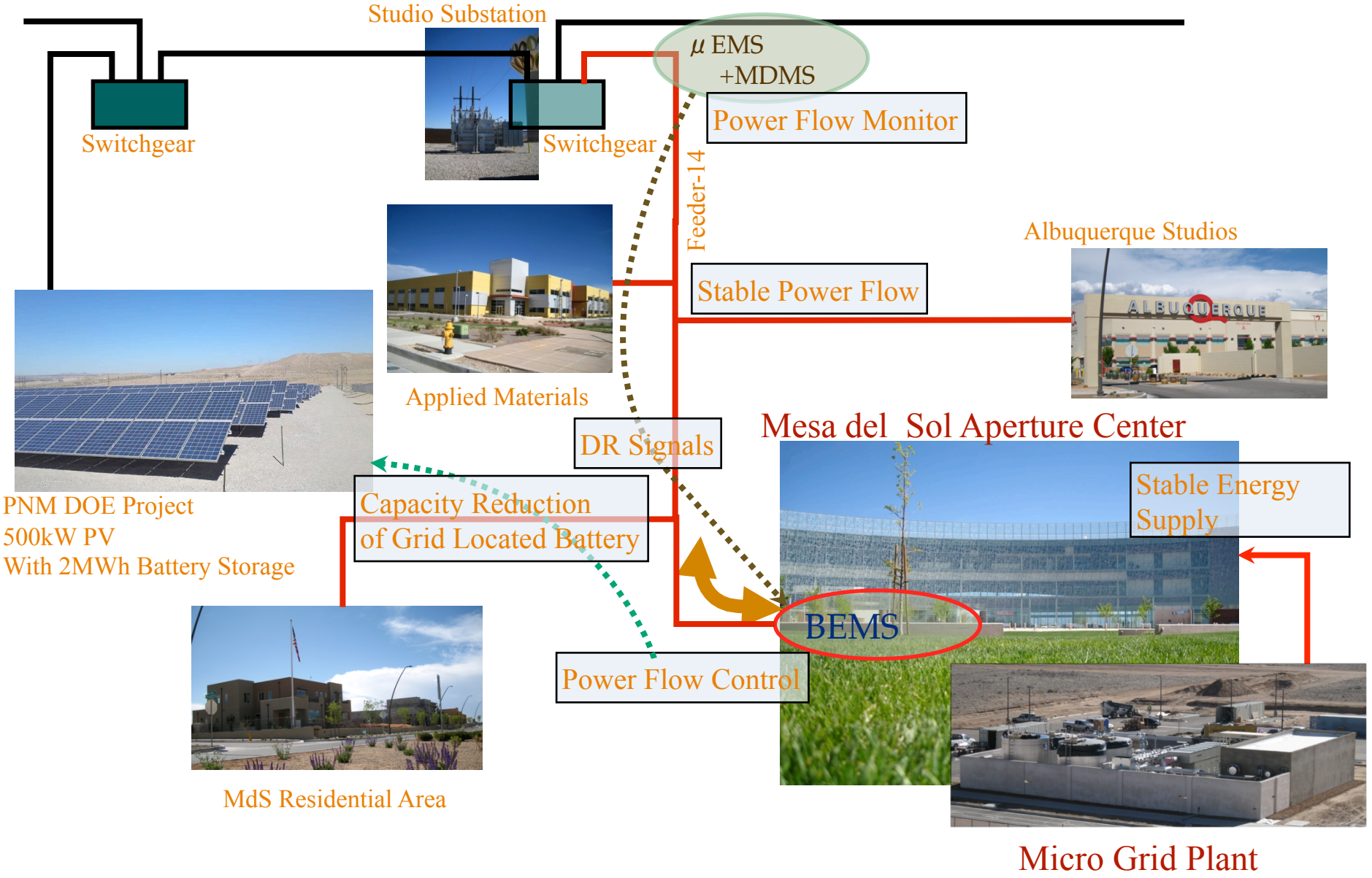
Smart house



- ✓ A HEMS that maximizes PV power generation, energy storage devices and IT electrical appliances based on demand response signals from grid systems, including price signals, will be demonstrated.
- ✓ An in-home system that supplies electricity in case of a power outage will be demonstrated.
- ✓ ZigBee will be applied for in-home communication.

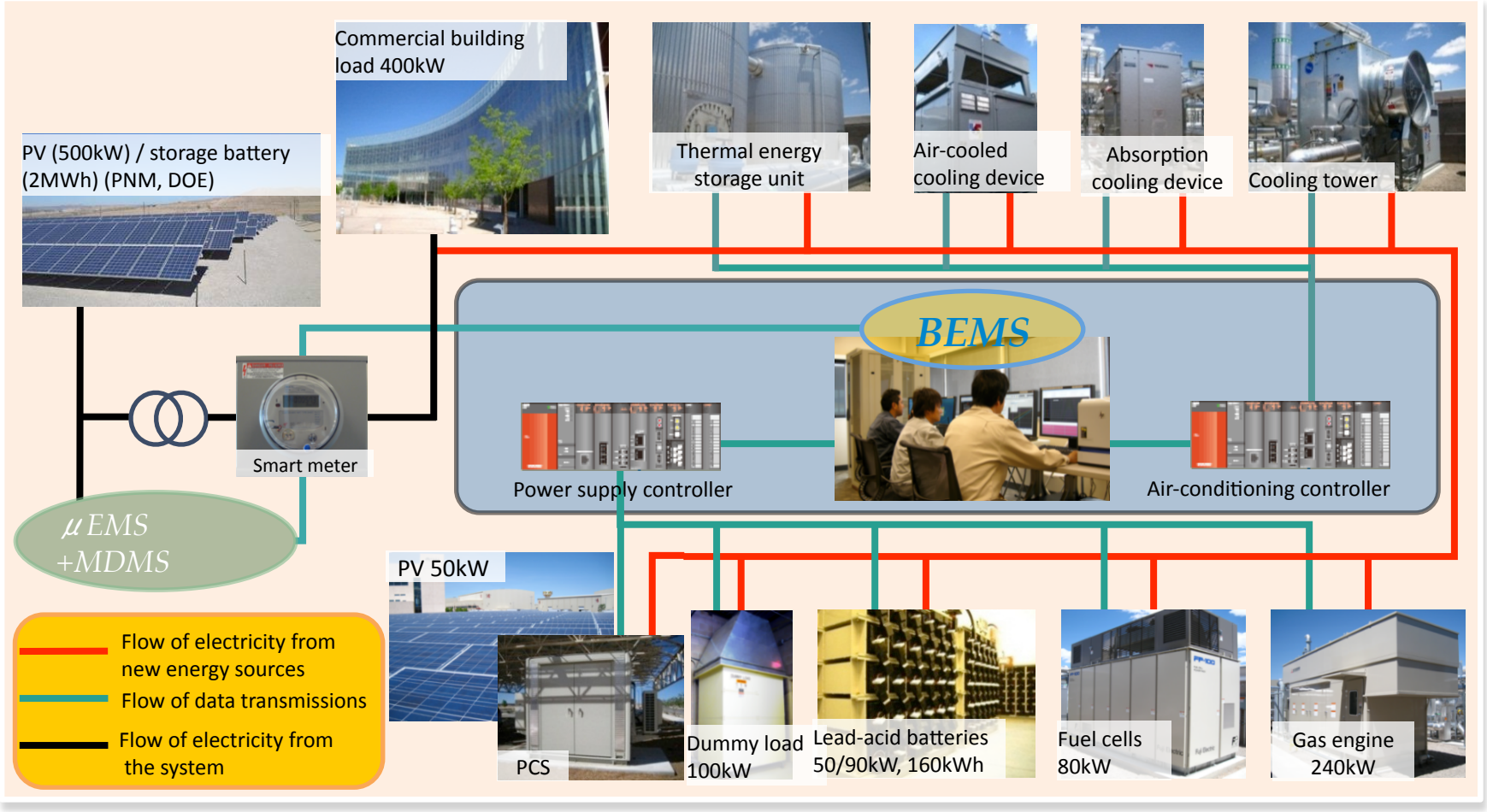
Ⅱ. Result of NEDO Project in New Mexico

Smart Grid Demonstration in Commercial Areas in Albuquerque

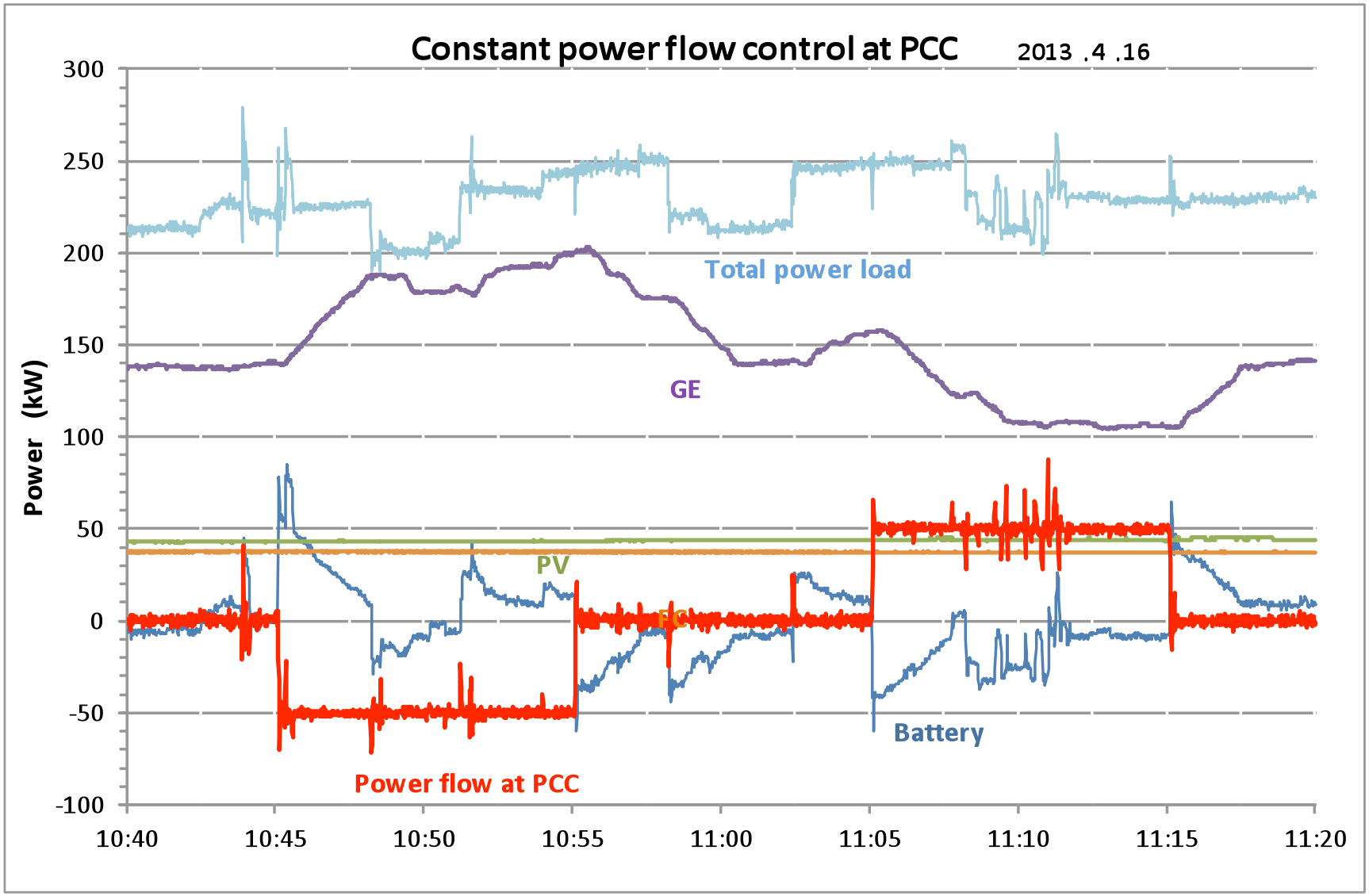


Smart Grid Demonstration in Commercial Areas in Albuquerque

Demonstration of a smart building "capable of responding to demands from the power system (and also capable of independent operation)", the focus of much attention after the earthquake

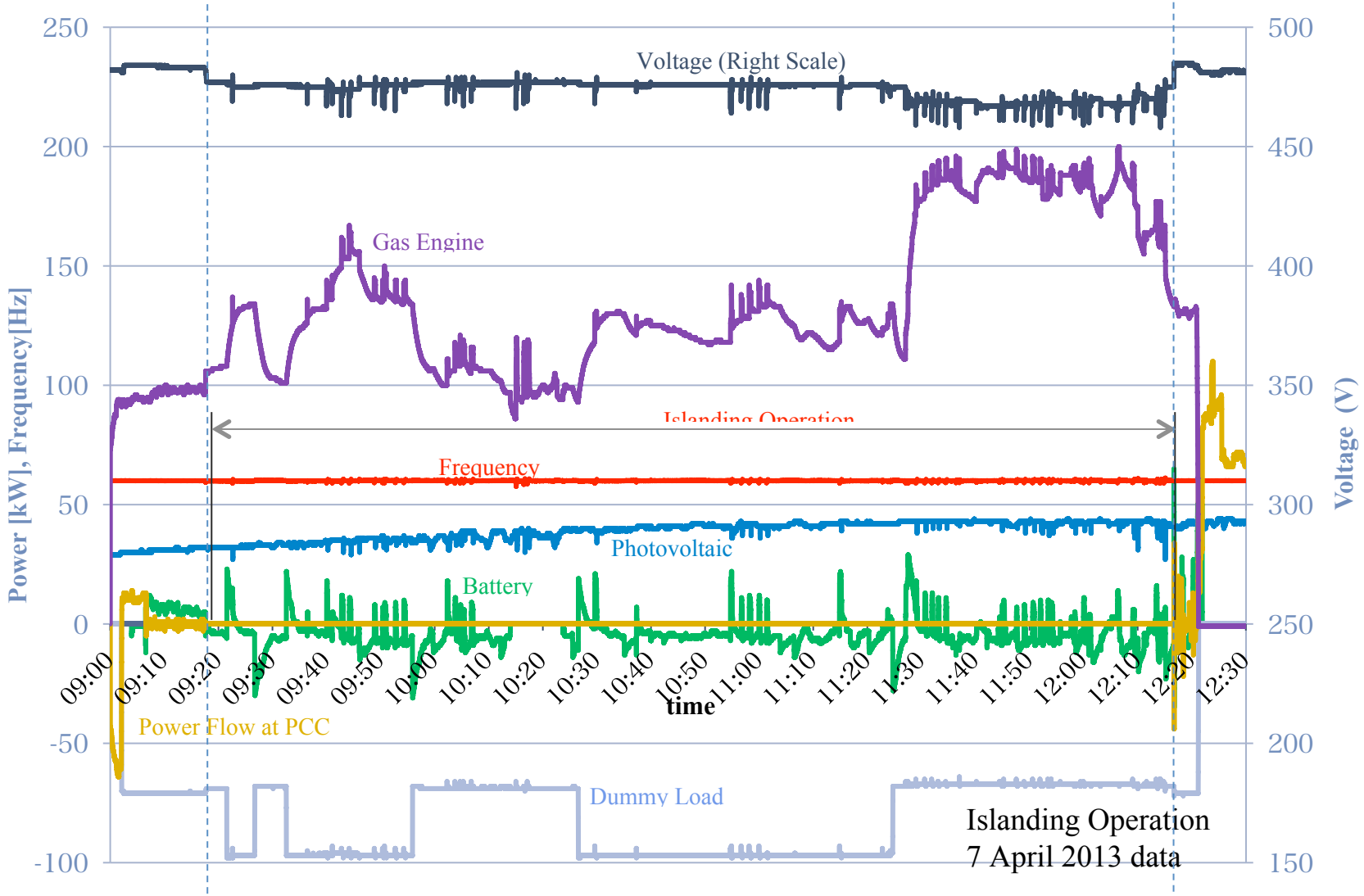


BEMS control results in interconnected mode



Shimizu Corporation

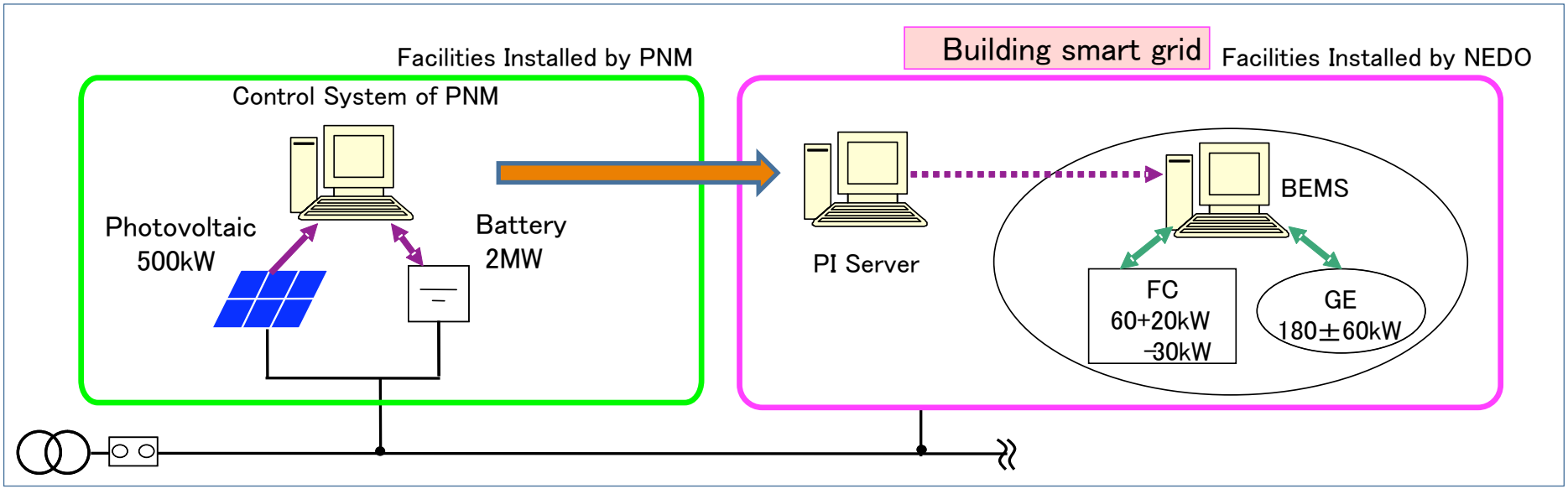
BEMS control results in islanded mode

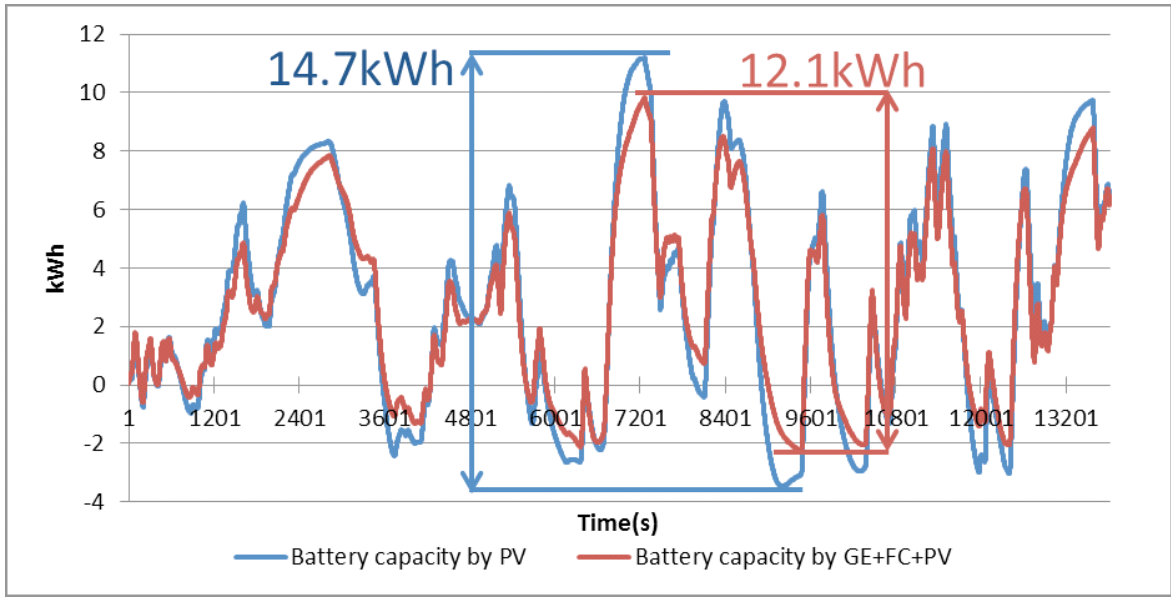


Shimizu Corporation

Smart Grid Demonstration in Commercial Areas in Albuquerque

Capacity Reduction of Grid Located Batteries





17.7%（14.7kWh→12.1kWh）
reduction of battery capacity

Tokyo Gas

Thank you very much
for your kind attention!